

Interactive comment on “Evaluation of operational model forecasts of aerosol transport using ceilometer network measurements” by Ka Lok Chan et al.

Anonymous Referee #1

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General comment: The authors have compared attenuated backscatter profiles calculated from model simulation of the European Centre for Medium-Range Weather Forecast Integrated Forecast System (ECMWF-IFS) and ceilometer network measurements operated by the German weather service (DWD) over one year from September 2015 to August 2016. For this comparison it was necessary to convert the mass mixing ratios of 11 aerosols types of the model to attenuated backscatter described in detail in Section 3.1. This conversion involves a lot of assumptions, simplifications and uncertainties, and not surprisingly, the agreement with the ceilometers is not very strong. Given the complexity of the approach and the discrepancies in the results the benefit remains unclear. The ceilometer network in Germany is dense enough (and still in-

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creasing) to give a relatively complete picture of the vertical aerosol layering over the country. Although the paper is generally well written I am reluctant to support its publication unless the authors explain more convincingly the purpose of their investigation. Detailed comments: p. 3, line 10: explain GEMS p. 6, lines 8-9: Why does this not apply to ceilometers of DWD? Why discussing β_P when not used? p. 10, line 2 ff: better rename CL (e.g. calibration factor instead of constant) as it is variable p. 11, lines 19-21: re-phrase sentence (grammatically not correct) p. 12, line 15: 120 ceilometer profiles per which time span? p. 15, lines 5-6: is there any proof of this statement? (we learn that the presented IFS model results are very uncertain) Later the authors state that sea salt is probably over-estimated. Fig. 10a: the high backscatter between 00 and 06 UTC is not discussed/explained. p. 15, lines 26-27: The night-time mixing height is very likely even much lower than the mentioned 1.5 km. The phrase in parentheses does not support the statement outside. Section 4.2: partly speculative, many unproven assumptions, not convincing

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